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THE SOUTHERN AGRICULTURIST.

(NEW SERIES.)

Vol. III. FOR APRIL, 1843. No. 4.

ON THE APPLICATION OF THE PRINCIPLES OF VEGETABLE PYHSIOLOGY AND CHEMISTRY TO AGRICULTURE.

BY HENRY R. MADDEN, M. D.

(Continued from page 9.)

LIMING.

To enter minutely into all the effects produced by the application of lime to soil, would require a separate essay. We will not attempt, therefore, anything beyond a mere enumeration of the effects, and thence form a correct judgment of the cases to which it is applicable. Lime has three distinct great effects, in addition to several minor ones; 1st, it greatly hastens the decomposition of the organic matter in the soil, and in doing so, renders it much more valuable to the crops; 2d, it alters the texture of the soil to a certain extent, proportioned to the quantity applied; 3d, it adds, of course, calcareous matter to the soil. From these considerations, it follows that lime is applicable to all cases where there is an accumulation of undecomposed vegetabie matter, as in the poor old pasture, heath, peat-moss, moorland, and the like. But, on the other hand, lime is contra-indicated in two classes of soils, viz: in those which are poor, from the want of organic matter, and not from the want of care, as very poor moorland, thin shifting sands, &c.; and also in soils abounding naturally in chalk. A careful examination of the cases should always be made prior to the application of lime, in order to ascertain whether it be judicious or otherwise, and likewise to determine the quantity likely to prove most useful; this should be regulated by the quantity of organic matter and of chalk in the soil, for the proportion of lime requisite will increase with the *increase* of the organic matter and the *decrease* of the chalk. The more organic matter, the more lime; the more chalk, the less lime will be requisite to produce the desired effect. It must, however, be remembered that, except in instances where there is a deficiency of calcareous matter in the soil, lime does not add directly to the fertility of the soil, but only increases it, by calling into activity what existed there before in a useless condition.

It follows, therefore, that however great the benefits of liming may be, it really exhausts the soil, and hence should not be *repeated* without great caution; indeed, we are convinced that few lands, except perhaps peaty soil, will profitably bear a repetition of severe liming. The practical advantage of being acquainted with the foregoing facts, is obvious; without it, indeed, liming becomes a most hazardous operation, particularly to the landlord's interest; for, many lands will yield, for a year or two, heavier crops, after a good liming, but afterwards the productive powers fall as much below the natural standard as they had been artificially raised above it. This observation, of course, applies only to such soils as either ought not to have been limited at all, or which, having been already subjected to the process, cannot bear its repetition without an ultimate loss.

In other soils, namely, those which are abundantly provided with undecayed vegetable matter, the good effected by the lime, in improving the texture, clearing the soil, and adding considerably to the impalpable matter, is far too great to be overbalanced by the diminution of the *absolute quantity* of organic matter in the soil, which is the necessary result of the increased rapidity of decomposition induced by its action.

In the application of lime to a soil, two things require especial attention, viz: 1st, the condition of the lime; and 2d, its chemical constitution. 1st. A knowledge of the condition of the lime at the time of its application, is most essential, because according to this depends, in a great degree, whether it be very beneficial or nearly effete. The utility of lime in effecting the decomposition of organic matter, depends upon a chemical change which occurs during its transformation from *burnt* or *quick-lime* into *mild-lime* or *chalk*; it is necessary, therefore, that the lime and organic matter be in contact during the whole progress of this change. This may be effected in one of two ways; either shake the lime rapidly, spread it over the soil, and immediately afterwards plough it in; or make the lime into compost heaps, by digging a sufficient quantity of the surface soil to mix with the lime; turn it at intervals, mix the two thoroughly together, and after a few months, spread the mixture carefully over the field, and then, as in the former instance, plough it in. The selection between these two plans must be regulated entirely by the particular circumstances of the place, the best time for driving the lime, condition of the soil, as regards the crops it may be under, &c, &c. 2d. As regards its chemical constitution, it must be remembered that, there frequently exists, associated with the calcareous matter, other mineral ingredients which may exert a most baneful influence upon vegetation; and it is obvious that this would destroy altogether the utility of the process, even were all the circumstances in other respects most favorable. This can be determined at once by chemical analysis; and as the constitution of the rock seldom varies considerably in one deposite, a

single analysis at the quarry would generally be sufficient for the whole time during which it was worked

(14.) *Paring and Burning*.—The immediate effects of this process are fourfold. 1st, It destroys a large quantity of organic matter. 2d, It alters entirely the texture of the portion to which the heat is directly applied. 3d, It reduces to a caustic state the alkalies and alkaline earths contained in the burnt portion; and 4th, By means of these alkalies it acts upon the remaining organic matter of the soil exactly as lime does. To arrive at a just conclusion as to the true economical merits of this process, we must bear all these four facts in mind. 1st, As it destroys a large quantity of organic matter, it of course exhausts the soil to the extent of the quantity destroyed; this is, therefore, in one respect, a disadvantage. 2d, As it completely alters the texture of the portion burnt, viz: by giving to the clay the feeling and texture of sand, we must consider how far this would be advantageous to the soil. 3d and 4th, As it produces alkali which acts upon the remaining organic matter of the soil, and thus further detracts from its supply of organic matter, it becomes of importance to decide whether the soil will bear the deterioration without a real loss of value. A careful comparison of the whole question leads to the following conclusions, viz:—that with the exception of the alteration of texture above alluded to, paring and burning act in a similar manner to (though in a much greater degree than) lime, and that economically considered, liming, when applicable, is in almost every instance preferable, because the same is effected with less loss. We should conclude, therefore, practically, 1st, that where lime is expensive, and the soil much injured by excess of undecayed woody fibre, paring and burning may be preferred. 2nd, Where the soil is a stiff clay, containing a sufficiency of calcareous matter naturally to supply the demand of the crops, paring and burning would be the most advantageous. 3d, Upon sandy soil, not much overgrown with useless woody weeds, liming is far the best; or if the soil be already abundantly supplied with lime, then neither should be applied, but in their places wood ashes or kelp.

Thus much for the treatment of soil. We shall next examine,

II. *The effects of vegetation in soil*, or the various methods in which vegetation has been proved to effect the soil. Science has been enabled to explain satisfactorily the causes of the following well ascertained facts:

5th. Concerning soil in its natural state:

(15.) Uncultivated soil, however rich, becomes gradualty less and less fertile until it has attained the condition either of moor or marsh.

(16.) Uncultivated soil retains its luxuriance for the greatest length of time when covered with forost trees and other large vegetables.

(17.) Land not disturbed by the plough produces successive

crops of different kinds; or, in other words, a sort of natural rotation is, to a certain extent, maintained.

(18.) On uncultivated land when any species of plant disappears, its place is supplied by one of less value as an article of food, and thus the richest pasture comes in time to produce only the coarsest and most worthless species of grass.

(19.) Although the natural produce of uncultivated soil thus uniformly decreases in value, the soil itself becomes progressively richer; so that when brought under the plough it will yield much larger returns than could be expected from its spontaneous produce.

6th. Concerning regularly cultivated soil:

(20.) Soil continually ploughed yields its nourishment in much greater abundance, and with greater ease, to plants growing upon its surface.

(21.) The facility with which the productive power of *well* cultivated land is diminished, depends on its organized matter being more easily converted into compounds soluble in air and water.

(22.) The decrees of fertility in *carelessly* cultivated soil depends in addition to the above circumstance, upon a diminution in the proportion of its impalpable matter.

(23.) Cultivated land, when properly taken care of, becomes gradually richer and richer, notwithstanding the increased quantity of produce annually removed from it.

(24.) If the same plant be cultivated for several years successively upon the same spot, the soil much more rapidly decreases in fertility than when a variety is kept up.

(25.) Some of the most valuable mineral constituents of soil decreases in greater rapidity in proportion to the greater care bestowed upon its cultivation, altogether independent of the portions removed by the crops.

Let us now proceed to the explanation of these facts.

(15.) Uncultivated land, however rich, becomes gradually less and less fertile, until it has attained the condition of moor or marsh. This, and several other of the facts related in the present section, are capable of being explained by reference to the important functions of azote in the vegetable economy, concerning which much has been ascertained during the last few years, and from which several general facts may be deduced, although, it must be confessed, we are yet very much in the dark respecting the fundamemtal or governing principles that regulate the facts in question.

Careful observation has proved the two following very important circumstances, viz: 1st, That the more azote any plant contains, the more dependent it is upon the soil for its support. 2d, That the value of any plant for food is, *cæteris paribus*, directly dependent upon its quantity of azote. Now, if we trace the history of

any portion of soil, we shall find that it has gone through two distinct changes, which are exactly the reverse of each other. Let us suppose, for example, that several seeds of various kinds are scattered on the surface of a rock: those which contain much nitrogen will shoot up with the others, but long before arriving at perfection, will wither and die for want of proper nourishment, so soon as they have exhausted the supply of azote originally contained in the seed; those seed, on the contrary, which contain but little of this elementary principle are so independent of the soil, that they can attain a certain degree of perfection, and produce a few seeds even upon the surface of a barren rock.

When autumn is passed, vegetation for the year ceases, and all the plants wither, and during their decomposition become mingled with a certain proportion of the constituents of the rock, which has become gradually disintegrated by the joint influence of their roots, and the moisture which they have retained about them. Thus a soil is produced. During the next spring, the seeds remaining in the ground spring up, and more plentifully supplied with nourishment, a more luxuriant crop is produced. This continues to occur from year to year; and as there are several natural sources from which soil derives its nitrogen, independent of the vegetable matter decaying beneath its surface, as, for instance, from the rain which falls upon it, the soil becomes more and more capable of producing those plants containing greater quantities of azote, or in other words, a tolerable rich pasture is the result. But no sooner has this occurred than a directly opposite series of changes commences; the soil has by this time become covered with a mass of root fibres, which mat it together, and prevent the free circulation of air in its interstices, and hence decomposition does not occur with sufficient rapidity to afford a supply of nourishment for highly azotised plants; these, therefore, die off, and as the evil increases annually, so the the fertility of the soil decreases, until its surface is covered with those plants which are so far independent of the soil, that they can arrive at perfection although it continue in the state just described; or, in other words, the soil has now become moor or marsh, according to its condition as respects water, for the only difference between the two is, that their herbage is regulated by the amount of dryness or moisture, those plants which require an abundant supply of water, thriving so luxuriantly in the latter as to keep under all other kinds of vegetation.

The practical advantage of an acquaintance with the above fact, is obvious, when we consider that upon a correct application of it must depend all the rational means of improving waste land, for as the fault lies in the condition of the soil itself, no surface application can be of permanent advantage.

(16.) Uncultivated soil retains its luxuriance for the greatest length of time when covered with forest trees and other large vegetables.

This also depends upon an analogous cause. The proportion of nitrogen in woods is very much less than in any of the herbaceous plants employed as food, and hence it follows that they are more independent of the soil, as far as regards organic matter. But in addition to this, large trees act upon a much larger portion of the soil; for whereas, in pasture land, few, if any, root fibres extend more than six or eight inches below the surface; in forests of long standing, it is almost impossible to state accurately the extent to which their roots penetrate, for if the soil be porous, they will travel to great distances in every direction. Again, the long duration of each individual plant is a great cause of the fertility being preserved, because as the root fibres are continually lengthening as their extremities, the tree is constantly coming in contact with new portions of soil; whereas, if one dies, and is replaced by another at short intervals, the new roots have to traverse the same spots which have been visited, and partially exhausted, by a former generation. These three reasons are abundantly sufficient to account for the luxuriance of natural forests being preserved for so much greater a period than that of natural meadows.

(17.) Land not disturbed by the plough, produces successive crops of different kinds, or, in other words, a kind of natural rotation is, to a certain extent, maintained. This is a most interesting fact; and although as yet our acquaintance with it is but limited, still the examples deduced to prove its truth are well worthy of attention, and should lead us to examine more minutely into the herbage of natural meadows to ascertain the extent of this change of crop. The most decided instance which has hitherto been published, is the following, which is related in M. Liebig's valuable work on the application of chemistry to agriculture. The author observes, that barren spots gradually appear in fields bearing only one kind of plants, but if "such a field be observed for several years, it is seen that the barren spots are again covered with vegetation, whilst new spots become bare and apparently unfruitful, and so on alternately."

But if we examine a portion of ground which bears several different species of plants, we shall find that some are continually disappearing, and other new ones supplying their places, or some of those already existing growing up in far greater abundance.—Thus, for instance, in all natural meadows, white clover and the finer kinds of grasses disappear, and are replaced by those of coarser growth; but if anything occurs to prevent these from completely overgrowring the soil, the clover and other grasses will re-appear after a short interval, again to be lost sight of in a few years. The knowledge of this is valuable, as proving to us that the necessity for a rotation of crops does not depend upon the plants being in a somewhat natural state from the effects of cultivation, but that it is requisite for all plants even in a state of nature, except perhaps those comparatively useless grasses which constitute

the bulk of the vegetation in all neglected spots. It is very desirable that more extended observations should be made on this point, for an acquaintwnce with the order in which plants succeed each other naturally, would assist greatly in the construction of a more perfect rotation than any hitherto suggested. In the meanwhile, we think enough has been learned to prove the truth of the statement, but by no means sufficient to enable us to draw any practical conclusions therefrom.

(18.) On cultivated land, when one species of plant disappears, its place is supplied by one of less value as an article of fond, and thus the richest pasture comes in time to bear only the coarsest and most useless species of grass. This may be considered almost as corollary upon the above, as it evidently depends upon precisely the same cause.

When a flowering plant is growing in a state of nature, it annually sheds its seeds in the immediate neighborhood, and consequently, (in the case of an annual) its place is filled the next year by all the produce of the seed, and the result is, that in a few years a large space of ground is occupied by the succeeding generations of one original plant; or should it be a perennial, much the same occurs, with the exception of the old plant continuing and checking the luxuriance of those seeds which fall on the spots already pre-occupied.

But when the soil becomes exhausted of the food best suited to the growth of this plant, it matters not how many seed may be shed upon it; they will all either die, or remain inactive, until stimulated by the presence of their favorite nourishment. When, however, soil is thus unfitted for the growth of one plant, it by no means follows that it is equally so for all; and, accordingly, some other seed which has accidentally fallen on the spot spring up, flowers, produces seed, and the whole series of the phenomena again takes place. Now, the following circumstance, connected with the influence of azote upon vegetation, regulates the order in which the various herbs and grasses succeed each other. The more azote a plant contains, the more dependent it is upon the condition of the soil, and at the same time, the more valuable it is for food.

These, therefore, are the first occupants of a luxuriant spot of ground. As the fertility of the soil diminishes, these gradually disappear, and are replaced by others less dependent upon the soil; or, in other words, containing less azote, and hence less valuable as food, and so forth, until at last the ground produces nothing beyond the coarse herbage of the moor or marsh,

(19.) Although the natural produce of uncultivated soil thus uniformly decreases in value, the soil itself becomes progressively richer, so that when brought under the plough, it will yield much larger returns than could be expected from its spontaneous produce. This statement may appear somewhat strange to those who

have attended solely to the theory of agriculture; while to the prcticaal farmer, however inexplicable it may be, still he is too well acquainted with the facts to doubt for one instant its truth.—Careful investigation removes the difficulty at once. The chief reason why the produce of uncultivated soil becomes continually less luxuriant, depends upon the soil remaining undisturbed, and in consequence of this becoming consolidated to such a degree that it assumes, for the time, some of the conditions of stiff clay, being nearly impervious to air, and losing the benefit of much of its impalpable matter, by its becoming agglutinated. The result of this is, that the decomposition of the organic matter of the soil either ceases altogether, or progresses at an extremely low rate. But plants obtain the elements of which their organic matter is composed from the air as well as the soil; the herbage, therefore, of land, in the condition just described, increases chiefly at the expense of the atmospheric supply of nourishment, and thus when it decays a new quantity of organic matter is added to the soil, and from the slowness of decomposition occurring therein, it gradually accumulates from year to year, so that when brought into cultivation, such soil will be found possessed of a much greater quantity of organic matter than it originally contained. A knowledge of this fact is of course useful, as it supplies us with a method of increasing the organic matter of soil, without the expense of adding manure to it; and although the crops produced in the mean time are undoubtedly inferior, still there are many situations in which this plan is by far the most economical. When, therefore, soil is losing its value from over-cropping, nothing more is necessary to reclaim such land than to lay it down in grass for a few years; and as the grass will of course be pastured by stock, the decrease of produce which generally occurs from year to year is fully compensated for by the droppings of the cattle, which increases the fertility of the soil so rapidly that the desired effect is in this manner produced some years sooner than could otherwise be the case.

8th. Concerning regularly cultivated soil:

(20.) Soil continually ploughed yields its nourishment in much greater abundance, and with greater ease to plants growing upon its surface.

This is one of the chief causes of the greater luxuriance of well-farmed land, as compared to that of the same texture, and under the same climate, which is carelessly attended to. There are two things which constitute the chief business of every good farmer; 1st, he must keep his soil in the condition in which its natural fertilizing powers are brought most fully and freely into exercise; and 2d, he must as far as possible increase their power. Now, continually and repeated ploughing and harrowing has this effect, by producing, as already shewn [9] the greatest amount of impalpable matter, and likewise insuring the free circulation of air; and we have likewise shewn [7], that the greater porosity of soil, the

greater the rapidity of decomposition of organic matter. Now, the practical benefit of being acquainted with this circumstance is, that the farmer may be led to bear in mind that the processes employed by him to increase his crops, have of necessity the effect of empoverishing his soil with greater rapidity than would have been the case had the land remained unemploped; and consequently, the more he removes annually, in the form of crop, the more must he add in the shape of manure.

(21.) The facility with which the productive power of *well* cultivated land is diminished, depends upon the fact of its organic matter being more easily converted into compounds soluble in air and water. This has been already explained under (7) and (20,) and therefore requires no further observation here.

(22.) The decrease of fertility in *carelessly* cultivated land, depends, in addition to the above circumstance, upon a diminution in the proportion of its impalpable matter. This is owing to a want of sufficient care in working the land so as to effect its pulverization, and likewise to allowing the old roots to remain in the soil, and thus permitting it to become foul. When a soil is foul, the old roots bind large portions of the impalpable matter together, producing, as has been already explained, masses which are of as little value as if they were stones, until something has been done to break them down. Thorough cleaning of land by ploughing, harrowing, and grubbing, is all that is required in this case to restore the soil to its original fertility, but without this, no quantity of manure will enable it to bring its full powers into action.

(23.) Cultivated land, when *properly taken care of*, becomes gradually richer, notwithstanding the increased quantity of produce annually removed from it. This depends upon the same general principle, as the gradually increasing richness of uncultivated land, viz: the quantity of organic matter annually produced by elements obtained from the atmosphere, so that every vegetating field is continually engaged in bringing down and depositing in the soil what was floating about in the form of gas. A number of calculations have been made to prove that the above fact demonstrates, that soil yields no organic matter whatever to plants; but all these are founded upon a basis altogether erroneous. They state, what is no doubt true, that as part of the produce is annually exported from the farm, and still greater part consumed and converted into beef and mutton, the quantity of organic matter added to soil can never equal that removed from it, unless manure be imported; and therefore, if cultivated soil becomes richer in organic matter, it proves that it has yielded *nothing* of this to the crops. There is obviously, however, a mistake here, because all it proves is, that the manure, and the atmospheric supply *together*, equal more than the whole weight of the crop; which the most accurate calculations will prove to be the case.

(24.) If the same plant be cultivated for several years succes-

sively upon the same spot, the soil much more rapidly decreases in fertility than when a variety is kept up. In treating of the kind of natural rotation which occurs upon uncultivated land, we stated that soil became unfitted for a continuance of the same plant, long before it was incapable of bearing others. The exact cause of this is still somewhat involved in obscurity, owing to the imperfect state of our knowledge respecting the precise form in which plants receive their nourishment; nevertheless, as far as our knowledge extends at present, we may state, that the chief reason of the rapid decrease of fertility of soil continually cropped with the same grain, appears to be that as different plants require their food in different conditions, while the same plant always requires the same elementary substances, both organic and inorganic, to be supplied to it; so, if the same plant is continually cultivated upon one spot of ground, too great a demand is made for some particular ingredient, and the crop begins to fail as soon as this becomes deficient in quantity.

If, on the contrary, a judiciously selected variety be kept up, the result is, that each succeeding crop makes use of that which the former did not require, and thus all the various nutritive principles are equally turned to good account.

(25.) Some of the most valuable mineral constituents of soil decrease in greater rapidity in proportion to a greater care bestowed upon its cultivation, altogether independent of the proportions removed by the crops. It is of considerable importance that this fact should be borne in mind. We think that far too little attention is in general paid to the *natural tax*, if we may be allowed the expression, which is laid upon all cultivated land. What we refer to is, that the operations performed on soil to enable it to produce heavier crops, have at the same time the effect of rendering the soil more easily detoriated by natural agents; so that the same means which enable the plants to obtain with greater ease a larger supply of nourishment, increase also the continual waste which occurs by the escape of valuable matter in solution in air and moisture.—The particular substances referred to under this head are the alkalies and alkaline earth, whose great value in soil is quite undeniable.

Now, we have already seen that ploughing and harrowing have effects, 1st, of losening the texture of the soil; and 2dly, of pulverizing it. When rain-water falls upon soil, it always contains a considerable quantity of carbonic acid dissolved in it, which acid has the power of dissolving a certain definite quantity of lime; now, the looser the texture of the soil, the more readily the rain flows through it; and hence it follows that the more a soil is ploughed and harrowed, the greater will be the quantity of lime annually carried off by the rain-water which finds its way into the drains.—Again, it is a beautiful provision of nature, for the purpose of preventing all soil from becoming soon barren, owing to the waste

of alkalies in it, that no alkalies, however soluble in water when pure, can be dissolved in water, when associated with the various ingredients constituting rocks and stones, until these are reduced to impalpable powder; but when they assume this form the first rain that falls is sufficient to wash it away, unless it has entered into some chemical combination which is less easily dissolved.—The result here, therefore, is precisely the same as above; the more you pulverize a soil, the more alkali will be annually removed by the rain-water.

The practical advantages of knowing this is, that it will serve to remind the farmer of the waste of valuable material which is constantly occurring in his soil, and hence prove to him the necessity of renewing these from time to time, should his crops give indications of a deficiency. [*Quarterly Journal of Agriculture.*

AGRICULTURAL MEMOIR.

[Read before the STATE AGRICULTURAL SOCIETY, at its meeting in December, 1842, at Columbia, S. C.; prepared in compliance with a Resolution of the BLACK OAK AGRICULTURAL SOCIETY, by their Secretary, WM. H. RAVENEL, Esq.; and ordered to be printed for the use of its members; and which we are happy in having an opportunity of inserting in our Journal.]

BLACK OAK AGRICULTURAL SOCIETY.

"RESOLVED, That the Secretary of this Society be, and is hereby requested, to prepare a Memoir on the subject of the Santee Long Cotton—its quality and its capacity of improvement for finer fabrics—the nature and quality of our soils—the adaptation of different manures and composts, and especially the applicability of *calcareous manures to our pine-land;* and the capacity of our common soils for other agricultural products than cotton.

"ALSO, a succinct history of the former cultivation of Rice in our inland swamps, and the practicability of again resorting to the same culture, and its probable profits, when carried to the market in its rough state; and, generally, on the subject of our agricultural condition. And to forward the same by a delegate, to the President of the State Agricultural Society at Columbia, at its meeting in December next, to be submitted to that body." [*Extract from the Minutes, March*, 1842.

IN compliance with the above resolution, the Secretary of the Black Oak Agricultural Society submits to your honorable body the following remarks on the different subjects referred to in that resolution.

The position which the State Agricultural Society holds, as the representative of the great agricultural interest, makes it also the organ of communication between the different sections of our State. The auxilliary Societies may thus be brought to act more in concert, and by free intercourse and interchange of opinion on the diversified soil and products of our country, on the custom and practice of each section, and the state of agriculture generally, be the useful means of developing our resources, and promoting the great object for which they were formed.

We therefore lay before you our practice, and the condition of our Agriculture; and through you, we invite the other Societies to co-operate with us, and contribute towards so useful an object.

We begin with the "*Nature and quality of our Soils.*" The region of the Santee Long Cotton commences at the head of tide-water on Cooper river, extends across the country to the Santee river, and above, as high as Vance's Ferry. Within these limits are embraced the head-waters of Cooper river, which extend to within a few miles of the Santee, intersecting the country in different directions, and forming along their courses large swamps, formerly cultivated in rice, but abandoned after the introduction of cotton, for the more profitable cultivation of the highland.

In the neighborhood of these streams are some of the best cotton lands. In their virgin state, they contain a growth of oak, dog-wood, &c., generally intermixed with the short-leaf pine, indicating the proximity of lime-stone to the surface. They are well adapted to the cultivation of the black-seed cotton, and comprise the principal portion of the Santee cotton-lands. Bordering the different swamps which intersect the country, they extend to various distances; in some places composing the entire highland between contiguous streams; in other places, extending to the ridges which separate the head-waters of the more remote streams.

Another class of lands which have been found well adapted to the culture of black-seed cotton, is that of "mixed growth," containing the pine, with an undergrowth of gum, oak, &c. These lands have a large portion of clay near the surface, and are highly improved by the application of compost manures. There is a gradual and progressive change observable in the forest growth of these lands. Whenever the pine has had possession for any length of time, and fires are excluded, a young growth of oak, hickory, gum, or of some other plant, which indicates good land, invariably springs up; and at the time the pines are disappearing from old age, this second growth is ready to take possession of the soil.—Thus a tract of country which would now be classed as pine-land, might in the course of 30 or 40 years, become of "mixed growth;" and in a half century after, when the pines had entirely given way to the undergrowth, would be designated as oak and hickory. So, also, when an oak forest is declining from old age, a young growth of the same tree can never flourish; but when cleared and thrown out of cultivation, a growth of pine invariably follows. These changes are all consistent with the theory of Liebig and other agricultural Chemists, that as different plants require different alkaline bases for their full development, a soil which has for a long time been supporting a certain kind, becomes exhausted of those ingredients necessary to that plant, and is thereby rendered unfit to maintain a young growth of the same; but another plant which requires less, or of a different kind, may find a sufficiency. In this condition, the land is partly in a state of rest; and, from the

gradual and continual disintegration of the soil, is preparing another supply of food for its former tenants.

The pine forests in this section of country are extensive. They generally form the ridge-lands which separate the head waters of the more remote streams, and vary in texture, from light sandy soil to dark clay loam. Those of the former description will never repay the trouble of clearing and cultivation; the latter, when capable of being drained, have been found productive.

The inland swamps, formerly cleared and cultivated in rice, but now abandoned and used only as pasturage grounds, comprise a large body of the lands in this section of country. They are formed by the tributary streams of the Santee and Cooper rivers, and vary in extent as well as in the texture of their soils. The ridge land which separate the waters of the Santee and Cooper rivers approach within a few miles of the former. Of course the streams, which enter the Santee are few. The branches of Cooper river traverse a distance of 15 or 20 miles, the swamps becoming wider until they unite at the head of tide-water, to form the valuable rice-lands of Cooper river. Below the alluvial deposites of these swamps, is generally found calcareous earth—either in the form of rock, limestone. or in a friable mass, intermixed with variable proportions of sand and clay. These beds of calcareous earth, in many situations, may be obtained with little labor; and when the proportion of lime they contain is in sufficient quantity to repay the cost of digging, may be used with decided benefit to supply an ingredient to our highland soils, in which they are all deficient.

On the "applicability of Calcareous Manures to our Pine-land."

It has long been observed that the growth on the land invariably indicates the proximity of limestone to the surface. Thus, on the fertile lands bordering the swamps, where the growth is composed of the red-oak, dog-wood, poplar, and short-leaf pine, limestone may always be found within 8 or 10 feet of the surface. On the contrary, wherever the long-leaf pine predominates, it is never found at the ordinary depth of wells. At the Eutaw Springs, the limestone is on the surface; and in the pine-land, 3 miles distant, wells have been excavated to the depth of 50 feet without reaching it. In this respect, it only follows the order of other stratified rocks, croping out in some localities, and in others far burried in the bowels of the earth. The extent of the fossil limestone strata has not been precisely defined. It is believed, however, to be continuous from Virginia, Southward, and South-westward, as far as Alabama, including the whole country between the falls of the rivers and the sea.

From specimens which have been analyzed by Professor Shepard,* the limestone of this section of country varies from 87 to 94 per cent. of carbonate of lime.

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* See March No. Southern Cabinet, for 1840.

The term marl, is now generally applied to these fossil remains, when they are in a finely comminuted state; and form, by the admixture of sand and clay, a friable mass.

The beneficial effects of calcareous earth, by which I mean the carbonate of lime, (mild lime,) when applied to land deficient in that ingredient, have been proven beyond the shadow of doubt. A series of experiments conducted by Mr. Ruffin, of Va., for a period of upwards of 20 years, with accuracy, and under a variety of circumstances, on different soils, and in various quantities, have placed the highly useful qualities of this manure beyond dispute. The revolution it is now effecting on the almost exhausted lands of lower Virginia, is the best evidence of its fertilizing qualities. If lime has failed on some soils of producing any good effect, it differs not in that respect from many other mineral manures, which are acknowledged to be valuable. Gypsum and the nitrates, in certain localities, have produced wonderful effects upon vegetation, in others they have failed entirely. But although the modus operandi of lime and its salts, has not yet been thoroughly investigated, chemical science has unfolded enough to guide us to some useful results, and to warn us from some errors.

Lime is never found in nature, in any uncombined state; its affinity for the acids being so strong, and carbonic acid, the most generally diffused, it is usually found as a carbonate in the form of limestone, marble, or chalk. When this carbonate has been subjected to white heat for a length of time, the carbonic acid is expelled, and the lime is found to have lost nearly 44 per cent. of its weight. It is then quick-lime. On exposure to a moist atmosphere, it gradually falls into powder; or, this may be caused immediately by the addition of water, when it becomes slaked-lime. In this state, it is a combination of lime, with about one-third of its weight of water, and is what the Chemists term hydrate of lime. When hydrate of lime, or slaked lime, is exposed to the air, it gradually absorbs carbonic acid, until it has regained that which it lost from its burning, (nearly 44 per cent. of its weight,) and then becomes carbonate of lime again.

From some of the known qualities of lime and its carbonate, we may judge of its probable effects under certain circumstances.—Thus, quick-lime cannot long remain exposed to the air, or in contact with the organic matter of the soil, without absorbing carbonic acid from one or the other. When applied, therefore, to a soil in which there is much inert, innutritious vegetable matter, it effects a partial decomposition of the vegetable matter, abstracting a sufficient quantity of oxygen and carbon to convert it into a carbonate, thereby causing new transformations, and rendering those inert substances more soluble and nutritious as the food of plants. On the contrary, when applied to soils which already contain nutritious matter in the form of composts, or decaying vegetable substances, the same chemical influence is exerted; it becomes a

carbonate at the expense of the carbonic acid of the compost manure; but, in doing this, it robs the soil of its most valuable ingredient.

On this account, quick-lime should be cautiously used, and with a full knowledge of its effects. It should never be applied to lands in which the vegetable matter is in a state of decay, and fit for the food of plants; but soils which are known to contain sufficient vegetable matter, and are still unproductive—low grounds, which cause the rust and blight, but which shew evidently, in their color and texture, the presence of organic matter—would probably be improved by the cautious use of quick-lime.

When the carbonate of lime, or marl, (the valuable ingredient in marl being the carbonate of lime,) is applied to land, no such chemical effect as that which follows the application of quick-lime, is produced; for the lime being already saturated with carbonic acid, requires nothing more from the organic matter of the soil.—Now, does this carbonate of lime, or marl, possess any specific quality as a fertilizer, or does it exert its beneficial influence in a variety of ways?

Let us now consider its mode of action:

1st. All writers on Agriculture, and all practical men who have used it, agree that lime acts mechanically upon the texture of the soil, rendering stiff clay-lands lighter and more porous, and sandy lands more compact and adhesive. Indeed, European writers class calcareous earth as one of the common ingredients of all their fertile lands; but in America, it has been found in but few.

2nd. When, in 1832, Mr. Ruffin published his essay on Calcareous Manures, he attributed their fertilizing power to the property of combining with some noxious acid in the soil, and neutralizing its effects—and from the invariable growth of sorrel *(Rumex acetosa)* upon such soils as he found highly susceptible of improvement by the application of calcareous earth, he inferred that this noxious acid was the oxalic. Now, oxalic acid is found in the juices of the sorrels, in the leaves and roots of rhubard, and other plants in the same way that the tartaric acid is found in the grape, and the citric and malic acids in the raspberry and strawberry, generally combined with lime or potash. After the death and decay of the plants, these compounds are subject to the same process of decom position which attends other vegetable substances. We might as well expect to find any other product of the organic structure existing in a soil, as oxalic acid.*

But Chemists have discovered other acids in soils, and of a more permanent character. Such are the humic and crenic acids.—They are the product of the decay of vegetable matter, and exist in most soils. With lime the crenic acid forms a soluble salt,

* On this subject, Professor Johnston remarks—"It (oxalic acid) is not known to exist in the soil or in the waters which reach the roots of plants. Where it is found in living vegetables, therefore, it must, like the other substances they contain, have been formed or elaborated in the interior of the plant itself."

(Dr. Jackson,) and the humate of lime is also sparingly soluble, (Liebig.) Dr. Jackson says that crenate of lime is generally found in the subsoil; and he adds—"on this depends the theory of subsoil ploughing." But these different substances and their mode of action upon the soil, has not yet been thoroughly investigated by Chemists. Until then, practical Agriculture can derive no positive benefit from their discovery.

3d. Calcareous earth acts chemically upon the soil in forming new combinations. Sir H. Davy mentions in his Lectures on Agricultural Chemistry, that a soil which had always proved unproductive, was submitted to him for examination. Upon analysis he found it to contain sulphate of iron, (copperas,) and recommended the application of lime. A new combination was thus effected; the noxious ingredient was rendered harmless, and another salt, sulphate of lime (gypsum) was formed, by which the soil was made fertile.

4th. According to Liebig and other Chemists, phosphoric acid exists in all soils capable of cultivation.—*Ag. Chem.* p. 200. In combination with lime, it forms an ingredient of the ashes of a number of plants and trees. Of the bones of graminivorous animals, phosphate of lime forms about 50 per cent.; of course this is all derived from the soil, in the shape of vegetables, and the grasses which serve as their food. Lime, in some form or other has been found in the ashes of most plants. Davy found sulphate of lime in the ashes of clover and the cultivated grasses. Dr. Dana states that the pollen of the *Pinus abies* contains 3 per cent. of the phosphates of lime and potash. On the same authority, the phosphates of lime and magnesia are found in the ashes of cotton and tobacco.*

Whenever lime is found in the ashes in the form of a carbonate, it must have been combined with the juices of the living plant.—During combustion, the vegetable acids are decomposed, and carbonic acid, which is always formed in the process, unites with the lime. The presence of lime in the ashes of nearly all plants, shows the important part it plays in the economy of vegetable life.

The foregoing remarks would, then, lead us to the following conclusions, viz: 1st, Quick-lime, or lime after it is slaked, but before it becomes carbonated, should only be applied to soils which contain a large portion of vegetable matter, or where this vegetable matter is in an inert state, and is to be partially decomposed before it can become fit for the food of plants. It should not be used on lands which contain nutritious matter in a state ready to be taken up by plants; because, when in contact with lime, the manure is deprived of its most valuable part, viz: the carbonic acid.

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* Dr. Dana also states that the diseases ergot and smut, show free phosphoric acid. Lime and its carbonate would both correct this defect, and form a valuable ingredient to the soil—phosphate of lime. The same application would probably prevent the rust in cotton.

2d. Carbonate of lime, marl, or calcareous earth, appears to possess many valuable properties as a manure. It improves the texture of the soil, making sandy lands more compact, and stiff clay lands more porous. Coming in contact with any noxious acids that may exist in the soil, it unites with them and forms salts of lime, which either improves the land, or are harmless. When applied to lands which contain phosphoric acid, it forms phosphate of lime, a valuable manure.

These different salts of lime, and the agency they exert over the vegetable kingdom, may tend to explain, in some degree, the fertilizing effects of calcareous earth on certain soils, and for certain plants.

Judging, therefore, of the probable effects of lime and its carbonate, from the foregoing facts, there could be but little doubt, theoretically speaking, of its being a fertilizer of all soils deficient in that ingredient. Mr. Ruffin, and the planters of lower Virginia have answered the question practically; and as evidence of the high estimation in which it is held, point us to their practice, and the rich return it yields them. With respect to its applicability to our pine-land, taking Mr. Ruffin's experience for our guide, there can be no doubt, as his experiments were chiefly confined to the pine-land. But all our high-lands, even the best, are deficient in calcareous earth, and would all probably be improved by it.

On the Adaptation of Composts and Manures.

In order to proceed understandingly in the application of manures, we should first ascertain what it is that plants require for their nourishment—in what form it should be presented to them—and, finally, in how much do the different manures that are applied to lands, supply them with their proper food. And here we must make use of the lights which science has shed on our subject. The Chemist, the vegetable Physiologist, and the Botonist, and the Geologist, have all labored for us. They have amassed a store of information for Agriculture—they are ready and anxious to offer their assistance. Shall we reject their proffered aid, and be content to grope our way blindly, satisfied with the little amount of experience which each one can acquire in his own limited sphere? Agriculture can then never hold that rank among the Sciences, to which her importance entitles her. This cautious distrust of all innovations upon old customs, is useful in a certain degree; but practical men have suffered their prejudices too long to stand in the way of their advancement. From the operation of this cause, Agriculture has not reaped the full benefit of their discoveries.—But scientific men are now turning their attention to the application of chemical truths to a practical system of husbandry; and, if differences of opinion still exist, it is no more than may be expected of a subject yet in its infancy, and so complicated in all its details.

But much is already known, and of that we may avail ourselves, in as far as it will assist us.

From the analysis of plants, they are found to consist of a few elementary bodies—carbon, oxygen, hydrogen and nitrogen, and a few earthy metalic bases, as potash, soda, lime, magnesia, &c., which are found after the plant is burnt, in the form of ashes. Of these few simple bodies, the entire vegetation of the Globe is composed; and the difference of form, habits and structure, and the infinitely various properties of plants, are merely the result of varying proportions of these few simple constituents, or the absence of one or more of them. The inquiry then arises, whence, and in what form are these bodies taken into the plant?

1st. *Carbon.*—It is now the generally received opinion of Chemists and scientific men, that plants obtain their carbon, partly from the carbonic acid, which is always a constituent of the atmosphere,* and partly from that in the soil arising from the decay of animal or vegetable matter, and that it is taken into the plant through the leaves and through the roots. The carbonic acid is decomposed by the leaves under the influence of light, the oxygen liberated, and the carbon retained.

2d. *Oxygen* and *Hydrogen*, are supposed to enter the plant in the form of water, which is then decomposed, and these elements furnished to the plant. Oxygen is also supplied from the atmosphere, and from the carbonic acid which is taken up and decomposed by the leaves.

3d. *Nitrogen.*—On the authority of Liebig, Johnston, and other Chemists, ammonia and nitric acids are the principal sources of the supply of nitrogen to plants. They are supposed to be received up through the roots, and to be decomposed in passing through the organic vegetable structure.

4th. The earthy bodies which compose the ashes, are taken up only in solution by the roots. For their supply, therefore, plants are dependent entirely upon the soil upon which they grow.

Let us now examine the system of manuring usually pursued with respect to the economy of collecting the materials, and their fertilizing effects.

Compost Manures.

The compost manures are made up of litter of all kinds from the woods, long and short leaf pine-straw, oak-leaves, &c. Of these the long leaf pine-straw is the least valuable, on account of its resinous matter, which is antisceptic, and requires a longer time before it reaches the proper state of putrefaction. Now, whether we adopt the opinion of European Chemists, that it is only in the form of carbonic acid that this vegetable matter furnishes food to plants, or whether it is in the form of soluble geine, as some Ameri-

* The atmosphere contains about 1-2500 of its bulk of carbonic acid.

can writers have contended, it can make but little difference, as far as the compost heap is concerned. They are both the product of the decay and decomposition of vegetable matter, and as soon as that state commences, the compost heap is in the proper condition to furnish food to growing plants.

But, besides their vegetable matter, the leaves of all plants contain a large portion of soluble salts, (*Liebig's Org. Chem.*, p. 161.) These salts are not disengaged, however, until decay has proceeded so far as to break down the vegetable structure completely, and ra composts are never allowed to remain unemployed so long, their agency is always secured.

The animal excrements contained in compost manures, whilst they assist and hasten the decomposition of the vegetable matter, contain in themselves highly fertilizing ingredients, in the form of soluble salts and ammonia. When exposed for any length of time to the sun and rains, most of these valuable ingredients are lost. The soluble salts are desolved and carried down into the earth; the gaseous parts are dissipated in the air. The great desideratum, then, is to economize and secure them. For this purpose, a close retentive soil should be selected, or, what would be preferable, a layer of clay or swamp-mud, shonld be spread at the bottom of the litter-pens. This would prevent the escape of the soluble matter. A covering over the pen, would protect it from the effects of sun and rain; but if this is impracticable, another layer of clay or swamp-mud should be spread over the surface, as soon as, or just before fermentation commences. This would arrest all gaseous substances, and would itself become a valuable part of the compost heap.

When it is remembered, that the most valuable ingredients of the compost heap are those most easily lost, viz: —the soluble salts and the volatile ammonia; is it not the dictate of ordinary prudence, to secure these matters, and not by neglect suffer the labor of the whole year to be lost?

The manures made in our stables and our cow-pens, may be said to contain the following constituents which furnish food to plants, viz: —carbonic acid, formed during the gradual decay of the vegetable matter; potash, and other alkalies contained in the leaves; ammonia, which is the result of the decomposition of the urine; phosphate of lime, magnesia and soda, and carbonate of lime and potash, from the solid excrement.

The question, then, of the adaptation of these manures, is dependent on our knowledge of their constituents, and a knowledge of the constituents of the particular plant to which we wish to apply them. The manure from the stable is always more fertilizing than that from the cow-pen, because the excrements of the horse is richer in salts than that of the cow. So, also, wheat, which contains a larger portion of gluten than auy other grain, is more sensibly improved than any other, by the addition of animal manure, because it fur-

nishes the nitrogen, an essential ingredient of the gluten. It is evident that when we ascertain the constituents of different plants, we then know what it is they require for their well being; and, if the soil is deficient in any of these ingredients, we must supply them by means of manures.

Cotton Seed,

Has always held a high rank among the meliorating manures, and to its fertilizing effects, every planter who has used it will bear testimony. It is the practice in this section of country, to apply it to small grain, or the provision crop, and always with decided benefit. To what peculiar property its good effects on a crop are to be attributed, has not been determined with any certainty. Experiments have proved that an equal bulk of the living seed is more beneficial than one of dead seed; and it has hence been conjectured that its effects were owing to the oily matter contained in the living seed. But we know that even when allowed to germinate and grow to the hight of 3 or 4 inches, and when all the oily matter must have been expended in giving nourishment to the young plant, it still has a beneficial effect on a crop. It will, therefore, require further and more accurate experiments, to prove that its good effects are alone attributable to that cause.*

Mineral Manures—Gypsum (sulphate of lime.)

This manure has not been used to any extent in this section of country. It has been applied to cotton by a few individuals, and generally, with decided benefit; but the experiments were not conducted with sufficient care, nor were the results noted accurately enough to make them of value for reference. Where it is successfully used, there is perhaps no manure that has produced such wonderful effects as gypsum.

It is said to show its influence more decidedly on clover and the cultivated grasses, than on any other crop; and, when it is remem-

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* During the germination of all seeds, there is a substance generated which Chemists have called Diastase. It possesses the property of dissolving starch, and after a while, of converting it into gum, and then into sugar. Its purpose seems to be to prepare the inert, insoluble starch of the seed, to be taken up by the young embryo, and of forming the compounds gum or sugar, as the necessities of the plant may require. It contains nitrogen, and when allowed to decompose, among other products, yields ammonia,—(Johnston.) If, then, cotton-seed be applied to a plant as manure, and it be crushed as soon as germination commences, the vital energy is destroyed, and the diastase formed during germination, is ready to decompose, and yield ammonia to the living plant. The other substances, also, in whatever stage they may be, also undergo decomposition, and furnish carbonic acid to the roots.

This theory of its action is merely thrown out to elicit inquiry, and induce experiments. The matter may be tested by treating some plants with the living seed, crushed to a powder, in which all the oily matter would still remain, and others, with the seed, allowed to germinate, and then destroyed.

bered, that these plants contain in their ashes sulphate of lime, it is readily accounted for.

Liebig says—"The striking fertility and luxuriance of a meadow, "upon which it is strewed, depends only upon its fixing in the "soil the ammonia of the atmosphere, which would otherwise be "volatilized with the water which evaporates."

The ammonia present in the atmosphere, is always the carbonate; when, therefore, it comes in contact with sulphate of lime, a mutual decomposition ensues, and two other salts are formed—sulphate of ammonia, which is not volatile, and carbonate of lime. And to the presence of this sulphate of ammonia, according to Liebig, is the luxuriance of vegetation owing. Professor Johnston, *(Lect. on Ag. Chem.)* does not admit that to this cause only is the effect of gypsum to be attributed. He contends that it plays an important part in furnishing the inorganic earthy food to plants, which is as necessary to their well being as carbon, or any other constituent. And his reasoning derives additional force from the fact, that gypsum is specially adapted to such plants as are known to contain that salt in their ashes.

The quantity recommended to be applied, is from 2 to 3 cwt. per acre.

Wood Ashes.

Until of late years, the subject of the inorganic part of plants, the ingredients of the ashes, had excited but little notice, and no application was made of a knowledge of their compounds to practical Agriculture.

As late as 1813, when Sir Humphry Davy published his Lectures on Agricultural Chemistry, he attached but little importance to these earthy constituents as the food of plants. He considered their agency as more mechanical in giving absorbent powers to the soil, or in improving the texture with regard to its capacity of retaining the heat of the sun. In the hands of Liebig, Johnston and others, it has become a subject full of interest; and, on their authority, a knowledge of its application is of the utmost importance in forming a truly fertile soil.

From analysis, it is found that different plants, and even different parts of the same plant, contain in like quantities of alkaline bases.*

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* Johnston gives the constituents of *grain of wheat*, and *wheat-straw*, thus:

Potash	19	½
Soda	20½	¾
Lime	8	7
Magnesia	8	1
Alumina	2	2¾
Silica	34	81
Sulphuric acid	4	1
Phosphoric acid,	3½	5
Chlorine	1	1
	100	100

On a proper application of this knowledge, depends in a great measure, the principle of the rotation of crops. Nature, when left to herself shews the necessity of such a course in the gradual and progressive change of the forest growth from one kind of tree to another, and in the succession of grasses and weeds which spring up on fields thrown out of cultivation.

On this subject, Professor Lindley remarks—"When it is "said that a plant becomes tired of the soil, and we find that "manuring fails to invigorate it, the destruction of alkalies in the "soil, and the want of a sufficient supply of these bases in the ma-"nure, seem to offer a solution of the enigma."

We know that when the sweet potatoe has been planted for more than 2 or 3 years, on the same land, and the vines cured and removed as fodder, the application of cow-pen manure alone, cannot keep up the productiveness of the land, although laid on ever so liberally. If an analysis be made of the potatoe root and vine, it will probably be found to contain some base necessary to its existence, which is not supplied by that kind of manure.* The value of ashes must depend very much on the kind of wood from which it is procured, and on the plant to which it is intended to apply it. Thus, the ashes of the oak would be the best that could be applied to the living oak; for, then it would have those earthy constituents it requires, presented in the exact proportions, and in a fit state to insure a healthy and vigorous growth, without waiting to obtain them from the gradual and slow disintegration of the soil. The same is true of any other kind of plant; hence the necessity of listing in the old corn and cotton stalks, and thus restoring to the land a portion of the inorganic food which had been taken up to maintain the previous crop.

This subject is one full of interest to the planter, and may tend to explain many things, which to him would be otherwise inexplicable.

Wood ashes has been long in use in European culture, and in the Northern States. It has been used in this section of country

* The surprising results which are sometimes obtained from the use of a very small and apparently insignificant quantity of mineral manures, shew the very important part they perform in the economy of vegetation. The facts are strictly in accordance with the theory of their action. From Sausure's table of Analysis we find Indian corn thus constituted:

Constituents of 100 *parts of Ashes.*

	Ashes from 1000 parts of the dry plant,	Soluble salts,	Earthy phosphates,	Earthy carbonates,	Silica,	Metalic ox ide	Loss,
Indian corn in tassel,	81.	69.	6.	0,25.	7,5.	0,25.	17.

From the fact of these earthy ingredients being always found in the ashes of the ndian corn, and almost invariably in the exact proportions above stated, it is evident that they are necessary to a healthy growth and full development of the plant, and that the soil must contain them in some quantity, or the plant cannot live. Now suppose an acre of land to containe organic matter enough to furnish the carbon, oxygen, hydrogen and nitroge nnecessary for the production of 40 bushels, and also,

the present summer, in cotton, at the rate of 10 to 20 bushels per acre, and with a promise of increased production to the crop.

The Nitrates.—The nitrate of potash (saltpetre) and the nitrate of soda, besides furnishing to the plant the ingredients of its ashes, also contain a most valuable element, nitrogen, which they yield to the plant in the form of nitric acid. These, and some other salts that have been highly spoken of in European culture, are, however, al present too costly to be used on an extensive scale, unless by actuat experiment, they are found to remunerate sufficiently to make their use profitable.

The Santee Long Cotton.

As stated before, the Santee Long Cotton is confined to the region of country embraced between the head of tide-water, on Cooper river, and the Santee, and extending above along the Santee, as high as Vance's Ferry. The long staple, or black-seed cotton, cultivated within these limits, has long been known in the market as the Santee cotton. Within the past 8 or 10 years, from the introduction of the finer seeds of the Sea Islands, the Santee cotton has lost that distinctive character it formerly possessed.—Like the Sea Island cotton, it has become more of a fancy article; dependent very much upon favorite brands and particular qualities of seed. From the great facility with which the different species impregnate each other, an almost endless variety has been produced; differing either in the shape or color of the leaf, the color of the flower, the shape of the pod, the texture and color of the wood, or the appearance of the seed. Like the rose and dahlia, the varieties have been so much multiplied, that it would be as easy to define the quality of the one, as to fix the distinctive color of the others. Until the past year, the average price of Santee cotton has generally been about 3 times that of Uplands. During the past season, they fell under that proportion.

The cotton of the Sea Islands, for fineness of texture and length of staple, have *always held* the first rank in the market. This difference has been generally attributed to the influence of the saline atmosphere in which they grew. From their proximity to the ocean, there is every reason to believe that it does exert such an influence, for as the cottons recede from the sea-shore, they

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that there is inorganic matter enough to supply such an amount of vegetation with, the soluble salts, earthy carbonates, silica and metalic oxides that are required.—Suppose, also, that the quantity of earthy phosphates present in the soil is only sufficient for 10 bushels. The phosphates being an essential constituent of the grain, it is evident that, although there may be a large growth of stalk and blade, but 10 bushels of grain can be brought to perfection. Now, by the addition of a small quantity of bone-dust, sufficient to furnish the earthy phosphates, the surprising result would be obtained of an increase of 30 bushels per acre, from the application of a few pounds of manure, apparently insignificant of itself, but sufficient to bring into action a vast amount of nutritious matter, which, without it, would have been useless.

eteriorate in quality. A like change is observable in other plants, which grow within the influence of the salt-water. The glasswort *(Salsola soda,)* when it grows in in-land situations, affords potash; when it grows in the sun-shine, it yields soda in its ashes, (Davy.) Whether those who plant beyond the reach of this saline atmosphere, will ever be able to supply the food so essential to that length and fineness of staple, possessed only to the Sea island cotton, is a problem yet to be solved. A chemical analysis of the finer and coarser cottons, would show in what they differed, and the deficient ngredient it may then be in our power to supply.

On the Capacity of our common soils for other Agricultural Products than Cotton.

Our situation as regards climate and cheapness of labor, gives us advantages over most agricultural nations. Owing to this cause, the Southern part of our State, and the sea-board of Georgia, have met with but little competition in the rearing of the finer qualities of cotton. We have been devoted so long, however, to our favorite staple, that we are as yet, in a great measure, ignorant of our own resources. Mr. Perrine, whose untimely death was a loss to the country, was engaged in the introduction and acclimation of Tropical plants in Florida. That his labors would have been crowned with success, there is reason to believe. It is worthy of remark, that our three great staples, rice, indigo and cotton, and the favorite sweet potatoe, were all originally natives of a tropical region. It would be an achievement of which a patriot might be proud, if, in the course of a whole life, he could present his country with one object of culture as beneficial as these have been.

Rice, was formerly cultivated in our inland-swamps, and the Santee-swamp, and might be again resorted to with profit. To this we shall refer in speaking of the history of the rice culture in our swamps.

Indigo, was, for a period of 40 or 50 years, the staple product of our State. It was introduced into Carolina from the West Indies, about the year 1742; and shortly before the war, according to Dr. Ramsay, the export had risen as high as 1,107,660 pounds. During the war, more attention was paid to rice; and shortly after, about the year 1971, East India indigo came into competition, and from its superior quality, being the product of a tropical region, so lowered the price of Carolina indigo in the markets, as to render ts culture unprofitable. Cotton was then introduced, and has been the favorite staple since that time.

Now that the *Morus Multicaulis* fever has passed away, and left sober reason to herself again, the silk culture has strong claims on our notice. There is no reason to doubt that it may be successfully reared, particularly in the Southern States, where the climate is so mild as to obviate the necessity of artificial heat. By the census statistics of 1840, Massachusetts, in 1839, produced 198,432 pounds

of silk cocoons. From the report of the Commissioner of the Patent-office, it appears that "the quantity of raw silk manufactured "in this country the past year, is estimated at more than, 30,000 "pounds." The report goes on to state that "the amount of silk "stuffs brought into this country in some single years, from foreign "countries, is estimated at more in value than $20,000,000." This is equal to one third of the whole cotton crop of the United States, valued at $62,000,000. One of the great advantages of this culture over all others, is, that it may be undertaken by persons of limited means, and occupying but 6 or 7 weeks in the spring months, it would not interfere, in our climate, with the cultivation of anycrop after the 1st of May.

Tobacco and *Wheat* might also be cultivated with profit in our State. Wheat was formerly cultivated very extensively in the middle and upper country, and the soil there would probably be better suited to that plant than the lighter soils of the low country.

The *Palma Christi*, or castor-bean, from which the castor oil is made, grows luxuriantly in our climate. From this oil, stearine has recently been extracted, an article of which candles, that are a good substitute for spermacetti, may be made.—*(Report Com. of the Patent office.*

But all these different products of cultivation that innovate upon old customs will be slowly received; their introduction must be the work of time. The farmer is proverbially distrustful of all novelties, and he requires the strongest evidence of a profitable investment, before he can be induced to abandon his accustomed occupation.—Such, no doubt, was the feeling, upon the early introduction of cotton into our country. It is related of a worthy old gentleman of this Parish*—one who had served his country with honor, "in "the times that tried men's souls," and was afterwards twice called to accept the highest gift of our State, that, actuated with a laudable desire of promoting the agricultural interest, he introduced the cotton-plant from Georgia, as an experiment. At the time for harvest, the fruit of his labor was no where visible; but upon search it was found concealed among the high grass which had taken possession of his field. Many, no doubt, were the prudent forebodings of anxious friends, that this novel cultivation could come to no good. But even on those very lands, it has yearly yielded its rich return; and now this despised little plant has become the very life-blood of the great nations of the earth, by its mighty pulsations diffusing health or disease, vigor or infirmity, through its giant frame.

On the former Cultivation of Rice in our Inland Swamps.

It has been stated before that the swamps forming the tributary branches of Cooper river, are extensive. Most of these, and large

* Gen. Wm. Moultrie.

portions of the Santee-swamp, were cleared and cultivated in rice before the introduction of indigo. The exact period of time at which these lands were first cultivated, has not been ascertained with certainty, but there is reason to believe that they were cleared for rice about the close of the 17th, or beginning of the 18th century. The original settlers in this section of country were the Huguenots; and their descendants still continue to occupy the soil. The revocation of the edict of Nantes, which took place in 1685, drove vast numbers of these Protestant Christians from their fatherland, to seek, in a foreign wilderness, that liberty of conscience, which was refused them at home. About the year 1690, a large body of Huguenot emigrants landed in Carolina. Their first settlement was lower down on the Santee, but they shortly after moved up, and occupied the country now embraced in the Parishes of St. Stephen's and St. John's (Berkley.) The original grants from the proprietary government, show that these lands about the head-waters of Cooper river, were among the first occupied. Rice was introduced into Carolina about the year 1693. According to Ramsay's history, as early as 1724, 18,000 bushels were exported. Indigo was not planted until 1742; but it is known that during the cultivation of indigo, these swamps were cleared, and had evidently been under previous cultivation. It is quite probable, therefore, that they were cleared and planted in rice, shortly after the Huguenot settlement was made.

Indigo, after its introduction, became the favorite staple crop.—It was found to be more sure and profitable, and rice was neglected. It continued to be the common staple of the country, until about the year 1791, when the East India indigo supplanted Carolina indigo in the markets. In this state of things, which happen just before the introduction of cotton, rice was again resorted to. Cotton had been cultivated in Georgia, but its progress North was slow. The early planters met with failures and discouragements, but they finally succeeded; and rice, since then, has been entirely neglected as a market crop.

Should the value of cotton decline so much as to render a change necessary, these old rice-fields may be reclaimed with comparatively little labor. It is believed that an average crop of 40 bushels per acre might be raised from these lands. Where reserves can be made to supply the fields with water, a greater amount of land might be cultivated; but without the assistance of water-cultivation, 3 acres to the hand is as much as can be well attended. The facilities of sending it to market in the rough, have been greatly increased by the opening of the Santee canal. The average value of rough rice for several years past, has been 75 to 78 cents per bushel. At that price, and with a production of 120 bushels per hand, rice would be as profitable as cotton, at 20 cents per pound. These remarks apply to the branches of Cooper river. The lands

of the Santee-swamp are of a much higher order of fertility. Rice was cultivated on those lands after indigo had become the favorite staple elsewhere, and until the increasing recurrence of freshets compelled the planters to desist from so hazardous a culture.—When the system of embankment, which is now in contemplation shall have been accomplished, these lands will again become as they once have been, the garden spot of the State. Already the energy and perseverance of one individual,* has secured to him a large body of these valuable lands; and should the experiment so successfully begun, be effectually carried on through the whole extent of the river-swamp of our State, South Carolina will contain within her borders, a tract of country equal in fertility to the Delta of the Nile. With genial climate, and the bright sun of Heaven over her, she will draw again to her bosom her alienated sons, and the gracious promise of old, will come to gladden her fields with joy, "that while the earth remaineth, seed-time, and harvest, and cold "and heat, and summer and winter, and day and night, shall not "cease.

IMPROVEMENT IN THE CTLTURE OF COTTON.

NO. II.

* * * Engagements of an urgent character, and without my control, have caused the delay of this number, which, with the advanced stage of the season, render it necessary that I change the order of my original design, as previously indicated in communicating with you upon "the improved culture of the cotton plant;" and instead of giving you the principles and philosophy of the system, &c., according to my views of the peculiar characteristics of the plant, under the various circumstances of soil and culture, I propose devoting this paper to "the details of the modus operandi by which my experiments have been conducted, together with the character and quality of the soil, &c." for the timely convenience of those kind friends, and other gentlemen in the cotton region, friendly to agricultural economy and improvement, who may have exercised only faith enough in the system, *acting wisely*, to make the experiment.

In commending this improvement, gentlemen, to the planting interest of the country especially, and previous to going into the details of its practical application to the culture of cotton, permit me to call the considerate attention of your readers in the cotton region, by a few brief remarks to two very obvious facts that exist,

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* Major Samuel Porcher, of St. Stephen's.

palpably destructive to the best interest of the cotton planter—the direct effect of the present system of culture. In the first place, I remark, that under the system of the country, the maximum production of cotton, *at a ruinous cost*, has equaled that of its consumption; which is generally admitted, I believe to be the principal cause of the low prices of the article, which general admission also agrees that such prices pay *very little*, if *any profit*, upon the immense capital invested in its production. I remark, again, upon the disproportionately large amount of *inferior and poor* cotton thus produced, as compared to the good, which, upon the authority of both merchant and planter, may be safely set down at from three to four bags of poor, to one bag of good cotton. The fact, so abhorrent to the natural order of all vegetable perfection, produces a state of feeling and an influence in the cotton market prejudicial to the real value of cotton, and consequently to the interest of the planter. These are plain matters of fact, and must have excited the attention of planters in some degree, especially the latter, which I suppose to have existed to a very injurious extent for at least the last quarter of a century.

To meet both these difficulties, and to convert them in a direct reverse ratio, into sources of profit, constitute but a part of the advantages which this improvement offers to the cotton planting interest of the country. It proposes to meet and obviate the former difficulty, by producing, as previously stated, the present and necessary amount of cotton, with but *one-third* the cost or capital now engaged in its production; furnishing thereby to the planter a *direct and net profit* of over 100 *per cent.* upon the present market price. To illustrate and prove this position, will be a part of the object of another number. Again; by subjecting the cotton plant to this system of improvement, which favors its natural arborescent growth, and the more perfect development of its staple and great prolificacy, the latter difficulty is obviated and the preponance changed, as clearly shown by my experiments, in favor of an infinitely superior staple; thus the planter receives nearly an entire crop of strictly prime cotton, upon the influence of which the market price becomes established, and its tendency favorable to the planting interest. I have not room here to do more at present, than merely to call attention to these facts. I now proceed to the immediate object of this number.

This improvement, when it shall have attained its highest state of perfection, contemplates the "*system of rotation*" in planting, under which the land designed for cotton lies the previous year in the state of fallow, which is found by experience most favorable to the growth and fruitfulness of the plant. I commence the preparatory operations for planting about the 1st of March, by spreading upon the land, *broadcast*, two to three hundred bushels of manure per acre—light stock yard and stable compost. I then run off the land in rows of three feet, with a scooter-plough, opening a good

furrow some three to four inches deep; this done, I take a large size shovel plough and cross the scooter furrows by rows, running at right angles, of five feet wide. I am now prepared to commence manuring in the hill, having first ascertained that I have 2940 hills on each acre, which will require, by giving each hill a half gallon of manure—some kind of compost—184 bushels nearly, which I haul on the land in a cart, first graduated to a certain number of bushels, and with spades likewise prepared for the purpose, I deposite the requisite quantity of manure in each hill. By this means, which in practice will be found simple and expeditions enough, I give four to five hundred bushels of mannre to each acre —*an infallible insurance* for 5000 lbs. of a superior staple per acre. As the manure is placed in the hill by rows, the wide way, a short distance in advance, a *good plough hand* follows with a turn-plough which should run into the soil from *six to eight inches deep*, at least, and turn well, with which four furrows are thrown together on each row: thus fixing the half gallon of manure in each hill, entirely within the *region of constant moisture*. This gives me a fine large bed, and well broke, to lie until at or about the 1st of April, when the cotton seed should be planted. This is done by first opening the bed as shallow as possible, with some instrument such as that described by M. W. Phillips, Esq., in the March number of the 9th vol. of the Cultivator. This I prefer to any other instrument of the kind I have ever yet seen, since its depth of furrow may be graduated to a positive certainty, so as to avoid disturbing the manures in the hill; it should not be opened out deeper than one inch. The bed thus opened, and the seed previously rolled in leached ashes or sand, which answer very well, though I prefer a compound of two parts of ashes to one of common salt, made moist with water; the seed, well rolled in this, are carefully dropped over the manure. Eight or ten seed in a place will answer to secure a stand. There will be no diffiuclty in dropping the seed over the manure in the hill, when it is recollected and observed that upon the unbroken space of some two feet between each row, the scooter furrows will be found an unerring guide to the manure in the bed at distances of three feet. The seed thus dropped I prefer to have covered with a hoe, *lightly and carefully;* bearing in mind this golden truth, that "a crop well planted is half made." Immediately after planting, the middles or unbroken bulks should be ploughed out. The crop of cotton thus planted, which should not exceed *three to four acres* to the hand, may be performed in good time and well done. In a few days, say nine to twelve, the cotton will be up, presenting a most healthy and thrifty appearance. The next operation to be performed, as early as possibly convenient, is to plough out the middles *well*, the wide way, with a good shovel-plough, having first run around the young plant with a scooter-plough. The hoe hands follow, and thin the cotton down to two stalks, giving it a small quantity of soil. This operation *well done*, the plant is at once

placed beyond all danger, since its tap-root will uow have taken such hold upon the manure below as to enable the plant to outstrip either grass or weeds, having yet to spring up.

Under this treatment, the *time-consuming*, and worse than useless operations of *bar-shearing*, *scraping* and *chopping out*, are saved, as much to the benefit of the tender plant, as to the interest and economy of the planter, in despatching the *hurry and push* at this stage of the crop; and at the conclusion of this first working, I have my cotton growing off and doing well. I have now no further use for a plough in its subsequent culture, but use the *sweep*—a kind of horse-hoe,—I call it a sweep, in the absence of a more appropriate name, an idea of which, may be had from the subjoined figure.

This instrument is easily made by any blacksmith, by laying the wings *a. b.* and *a. c.* upon the point of a scooter d. in the form of an isoseles triangle, which is fastened upon the chip of a shovel-plough stock, by a heel-pin, in the same manner you would a shovel. From the tip of the wing *b.* to that of *c.*, it should be 2 feet, forming a kind of *horse-hoe*, by which a row is swept out at 3 furrows. This should be so curved and graduated upon the stock as not to go into the soil deeper than 1 inch, and as much less as possible, to enable it to cut the young grass and weeds that may be springing up. The great and singular advantages of the sweep over all instruments of the plough, harrow, or hoe kind that I have ever used, are these—that it will *kill* a greater quantity of grass and weeds in a given time, and *do less injury to the surface roots* of the plant, *so essential* to its *progressive* prosperity. The hoe-hands following this instrument, thin the cotton to a stand, *one stalk* in a place, and draw up a small quantity of soil to the standing plant. The entire subsequent culture is performed with the sweep and hoe, which should simply scrape and pulverise the surface, so as to kill any grass and weeds that may appear, and allow a *free circulation* of atmospheric air to the fibrous roots of the fruiting stalk, requiring at this *critical period* all the aid and nourishment that culture, soil and atmosphere can afford. By the 1st of July my cotton stands from 5 to 6 feet high, and I have it topped by the 10th, at farthest, after which, I run the sweep once more through it, and the hoe, if necessary, to remove any grass that may have sprung up immediately about the stalk. After this, and by this time frequently in places, the cotton will become so much interlocked, and the ground so shaded, as to keep down all other vegetation—yet it may be found necessary again to chop about in places with the hoe, when the cotton may not have locked so early. This should be invariably attended to. This brings us again to the season of harvesting the staple. * * * * * *

It will be observed that manuring constitutes a large item in this system of improvement, a source of revenue too much underrated by planters, and consequently too much neglected, because the subject requires a little extra attention—which attention is so essential to the prosperity and well-doing of a farm. * * * But I hear some planters say—"it is impossible to produce so much manure"—this is, however, the result of inexperience, and the want of *determination*. I am entirely convinced from my experience in making manures, that it is not only practicable, but a perfectly easy task, to prepare upon every plantation in the cotton region, great or small, 1500 *bushels* of an excellent article of compost, per annum, to the hand—at a cost of less than two cents per bushel—by the assistance of the stock of horses, cows and hogs, upon properly arranged lots. This is done by having the lots well littered by throwing in pine-straw in large quantities and frequently, or oak leaves, where pine-straw is not to be had, with cotton and corn-stalks, &c., and occasionally haul and scatter upon the litter a few loads of muck or marl, one or both of which may be found on or near every farm in the country; upon these lots, pen and feed your stock every night. The manure thus prepared, should be collected in pens or pits, three or four times during the year, after heavy falls of rain, and the lots replenished with pine-straw, &c.—by this means, a very large amount of manure is collected during the season, and that, too, at an inappreciable cost. Again; we have another difficulty; there is but few persons who believe that pine-straw can be converted into manure; for the benefit and information of such who may read this, permit me to quote a single sentence from Liebig's celebrated work of Agricultural Chemistry: "The bark and foliage of oak contain from 6 to 9 per cent. of potash.—The needles and firs of pines, 8 *per cent.*" But it is not on account of the potash exclusively, that I prefer pine-straw to all other vegetable matter in the preparation of manure; since it possesses another invaluable quality above all others, in absorbing the juices of the manure, which are thus saved from evaporation, and readily applied to the land. I doubt not but a single year's experience will convince every intelligent planter of the innumerable advantages of this improvement, and its perfect adaptation to the culture of cotton and other crops.

I will now close this number by a very few remarks upon the character and quality of the soil upon which my experiments have been conducted. It is high ridge-land, readily recognized, and its quality distinctly understood, in our southern country, under the name of "*forked-leaf, black-jack pine barren*," a deep, porous, sandy, superstratum, lying upon a tolerable good clay, at a distance of 2 to 3 feet below the surface. A true picture to nature, and naturally poor enough. This, land nuder the treatment above detailed, grew my cotton, from which I have gathered a greater number of pounds per acre, (indeed almost double,) than I have

seen recorded, is in its natural state, inferior to the average quality of cotton land, by at least one half. I might refer you, if necessary, to more than one hundred gentlemen, planters from Georgia and Alaboma, who have examined my experiments carefully, and several of them, at various stages of its growth, and with one general consent, pronounced it a fair test and a great improvement. I have, from several stalks that grew on the three acres, in the proper places, taken 3½ to 4 lbs. of cotton, *carefully weighed*. In the perfection of this improvement, yet in a state of great crudeness, when every stalk upon the acre, (2,940,) *shall mature equally well*, what may I *reasonably* calculate to gather?

"————— Nil desperandum,
Possunt quia, posse videntur."

N. B. CLOUD, *M. D.*

Planter's Retreat, Ala. Dec. 26th, 1842. [*Cultivator.*

For the Southern Agriculturist.

EXPERIMENTS ON THE CULTURE OF CORN.

St. John's Berkley, 18*th Feb.* 1843.

MR. EDITOR:—In compliance with my promise, to give the mode in which a field of ninety acres was prepared for, and planted in corn, the last season, I now attempt to fulfil.

The land was originally very fine, but has been much planted and but little manured, and not with any other, in the last ten years, but cotton-seed, in a sparing manner, and is much poluted with the jointed and nut-grasses.

It had been planted the year previous in corn, and early in March last, a furrow with a common shovel-plough, was made in the middle of the old alleys, and another run on each side of this, filling it up, and making a small ridge. The rows, or ridges, were four feet apart, and holes, quite wide, were opened six feet apart, with the hoes; and, on the 21st March, the corn was placed in the middle of the holes, and the cotton-seed, which had been previously hauled on the land, at the rate of eighteen bushels per acre, was placed on each side of the seed-corn, and both covered with the hoes.

On the 18th April patched the field, as it was very missing, with fresh corn-seed, and a few days after, listed "to the corn," very

lightly, hauling all the weeds on the ridge made with the plough, and cut up the old corn-stalks, which were standing to this time.—On the 5th May, thinned it, leaving two in each hill; and on 10th May, put in the shovel-ploughs, and run a furrow on each side of the list, as near as could be done, and to each plough a small hand with a paddle, about nine or ten inches wide and a little hollowed, whose business was to place the paddle at the corn, at the time the plough was passing each hill, so as to prevent the dirt from covering up the corn, but at the same time enabled the furrow to be run so near it as to cover the cotton-seed that had come up about the corn. This operation saved the necessity of moulding, as the ridge on which the crop now stood was quite clean.

On the 20th May, run two more furrows in each alley, filling up those last made.

On 6th June, run three furrows in every *other* alley, which, for the first time, broke down the old ridges; and in the alternate alleys run two furrows, leaving yet a small ridge in the middle.—The object of this was to throw up enough earth on both sides as to make a trench or hollow, in which the peas were sown, on the 8th and 9th June, and the earth hauled up from the alleys only in which three furrows had been made, thus half bedding and covering the peas at the same time. The peas covered in this way, will come up at any season; planted in the usual way, it is necessary to do so, in moist earth, or, in planters' language, in "a good season."

On the 14th June, run a single furrow in those alleys in which only two were made the last time, and on the 16th, drew up from these alleys—thus completing the bedding, and gave the field no more hoe or plough work. In common parlance in was "laid by."

The corn was harvested on the 24th, 25th, and 26th of October, and placed in large square bins, and yielded by calculation made thus:—from the cubical feet deduct one half for the cob, and then one fifth. This is the mode relied upon in this vicinity, and according to this calculation, the ninety acres averaged nineteen and three-quarter bushels per acre. The corn was housed free of shuck.

In stating the dates, the day on which each particular work was begun, is given.

You will perceive, that in the whole season there had been seven furrows run in each alley, and except the listing, (which, in this instance, was done after the corn was up, and not, as is usual, before planting,) there was but one complete hoe-working, that is, every alternate alley hauled at one time, to cover the peas, and the others at another time. This must be conceeded as but a moderate bestowal of labor, especially for land having much of the grasses before named, as well as its due proportion of the common enemy of cotton and corn, namely, the crab-grass. Land intended for corn, even of a light nature, that has not been in cultivation the year previous, requires much more labor before the seed is put in, than was given in this instance; but on this subject, you may hear from

WALWORTH.

For the Southern Agriculturist.

ON THE MANAGEMENT OF A PLANTATION,

In reply to queries addressed to several Gentlemen interested in Agricultural Pursuits, by G. M.

Abbeville, 1st Oct. 1842.

My Dear Sir:—I now proceed to answer your Agricultural inquiries as well as I can in the compass of a letter. To make as large a crop as possible, with the least labor, is the problem which every planter should endeavor to work out. Large crops, made by incessant ploughing and excessive driving, exhausts both land and negroes. The first matter, therefore, that demands the attention of a planter, is to make as much manure as possible, by penning all his stock every night, and keeping their pen covered with litter, (oak-leaves and pine-straw will answer,) nine inches or a foot deep, avoiding the common error of having his pens too large. The theory of making manure is, to cause the liquid parts to be absorbed and retained by the litter. I apply my manure first to corn, and give none to the cotton but the surplus, if any. A more comprehensive mode of manuring, particularly for cotton, is to drill field-peas about the last of June, in stubble or other land, cotton distance, and in the fall, or even winter, open a furrow be-

tween the drills, deposite the vines and leaves, cover it up by two furrows of a turning-plough, and in the spring break out the middles and make a good bed with the hoe, so that in opening to plant cotton, the pea-litter will not be disturbed. I believe this to be equal to the best compost, even for the immediate crop, and better for the permanent improvement of the soil. But for this latter purpose, every planter has a resource which should never be neglected —that is, to list in the offal of the preceding crop, and all the vegetable matter on the soil. By this process in cotton, I have actually improved land, under constant cultivation, which, 10 years ago, I was advised to let rest, and which was evidently failing.

As this system is common in the middle country, I presume you are familiar with it, and I need only urge its importance.

The bedding system is the true system for cotton. It matures it in the soil and climate of Abbeville, two or three weeks earlier than the flat cultivation. The notion that cotton will not grow off till the tap-root strikes the clay, is totally erroneous. I either dibble my cotton, by putting from 3 to 5 seeds in a place, or drill it as thin as possible, so that when *chopped out*, it grows off immediately. You thus save seed, and secure a better stand, than you could by using more seed. I thin out to a stand as early as the cotton will bear it—that is, as soon as the third leaf appears.— Every thing depends upon forcing its growth and maturity in the spring, one week then being worth three in the fall. I top my cotton early, say the 20th to 25th July,

During the prevailing low prices, a planter cannot handle his cotton too carefully. Inferior cotton is not worth preparing and sending to market, and I prefer leaving dirty cotton in the field and losing it to mixing it with good cotton. If every tenth, or even every sixth boll were dirty, you would save by leaving them, unless you can pick them out separately.

I prefer to plant corn by throwing three furrows together, as we express it, between the old corn beds, in the winter, and cross check it the distance I intend to have the corn in the drill. Nothing more is done till planting time. I then open the three furrows with a common shovel, and follow in the same furrow with a subsoil coulter sent into the clay. The corn is dropped in the check, the manure is placed on each side of it by hand, and the whole

covered with the hoe, at least four inches deep. As soon as the corn will bear it, I run two furrows with the gopher, as near as possible to the corn, and as deep, then two more very close, with the turning-plough, having previously listed in the corn-stalks and litter, after the corn is up, or before, as may happen. In a week or ten days after, about the 20th May, I finish breaking out the bulks or middles, plant my peas and cover them in drawing up dirt with the hoes to the corn. After this, I never plough the corn, but clean it by harrowing, sweeping and hoeing.

I plant largely of potatoes and pindars, [ground-nuts,] which are better adapted to your part of the country than mine. They are fine for hogs, and ought never to be neglected.

I have given you a very hasty and imperfect sketch, and hope to have the pleasure of enlarging it when you pay your contemplated visit. Sincerely yours,, G. M.

For the Southern Agriculturist.

A NEW WAY OF SOWING OATS.

Beaufort, Jan. 23d, 1843.

MR. EDITOR:—Being anxious to sow my oats early in January, which I have found the best time, all things considered, I hit upon the following plan to do so, and save labor, which could not well be spared from the cotton-house: I had a 7-inch mould-board-plough, a shovel or bull-tongue would answer as well, run on the side of the cotton bed, the stalks having been previously cut into the alley, about half way up the bed; the oats were then sown in this furrow, and covered by another furrow by the bull-tongue-plough run a little higher up. The seed was mixed with cotton-seed, at the rate of six bushels of the latter to one of the former, and sown pretty thick, say three to four pecks of oats per acre. No minder was put in—and my oats are coming up very handsomely. As my oat-field is to be my slip-field, the beds are not levelled, and the stubble can be easily listed in; and, being sown thus early, they can be cut in May—time enough to plant slips in the same month. If my lands were rich and high enough, I would sow thickly in the

alley, run a double mould board-plough, or shovel-plough, shallow, then a furrow half way up the bed, as above, sow in that, and cover with another furrow, higher—thus giving four rows, as usual, instead of two, as I have. But as I had land, and not seed, I hope to make much more to the seed sown, by my plan.

C.

For the Southern Agriculturist.

CUTTING ASPARAGUS.

Beaufort, 23d Jan. 1843.

Mr. Editor:—I stumbled accidentally, and from carelessness, several years since, upon the plan of cutting Asparagus, which I have since seen recommended very highly; which is not to cut it below the ground, as usual, but to allow it to grow from fifteen inches to two or three feet long, and cut off about one foot of the the top. By doing so, almost the whole will be equally tender and well flavored; while, in the old way, only an inch or two is eatable. It is a fact, that Asparagus does not become tender until it turns green. I always thought it a poor vegetable, until I cultivated it, and gathered it as above; and now I find it one of the best. I think also, that there is a great deal more fuss, (pardon the word, as unclassical, but very expressive,) made about the cultivation of Asparagus, than there is any need for. I would say, make beds three feet apart, as if for cotton, lay your roots about eighteen inches apart in the alley, haul the bed back upon them, cover them well with fresh stable or other strong manure, immediately and every year; and if they are planted early in the winter, you may cut them twelve or fourteen months after. They may not possibly be as large as candles, but none the less palatable for that, nor bear any the worse for it—at least I have not found it so. If you live on a sea-island, and can make a bed in salt land, you will find it thrive to your satisfaction; and if you live in the interior, empty all refuse-salt and salt substances upon your bed, as its specific manure.

R.

MISCELLANEOUS.

MELONS.

Messrs. Editors—The time is rapidly approaching when those who desire fine gardens and garden fruits, must bestir themselves, as even before this they ought to have done. I propose in this present paper, to give you my opinion, on the cultivation, &c., of that very delightful fruit, the mellon. I know not that I have anything new to offer; but I know the past year showed clearly there was either want of the know how, or the providence to provide; for I never yet saw any one refuse these fine articles—even if of an indifferent kind. I shall therefore presume to direct.

The site of your melon patch is of some importance; and there is no farmer but that has some place better adapted than others.—Melons do best on a light, moderately rich soil; if a retentive subsoil, and it near the surface; select on sloping ground, that the superabundance of water can run off. If it is not sufficiently rich to produce say 20 bushels of corn, or 800 to 1000 lbs. of cotton, manure it broadcast, plough it thoroughly 6 inches deep—and do it immediately. Early in March lay off your ground with a shovel-plough, say 6 or 8 feet each way—in the center of such furrows take out at least a bushel of earth, and mix thoroughly with once or twice as much more, of well rotted stable manure and ashes, and thus make a hill broad, and if a foot deep dug in the earth, so much the better. On the top of this little hill, plant 3 to 6 seed, say as early in March as the season will permit—a few might be planted very early, and covered every night with a small box covered with thin cloth or straw.

The cultivation necessary is to keep the *whole patch* clean and well stirred. But if you desire to go into the cultivation as you began—the greatest yield from the smallest space and labor—you will search out the runner when commencing to run—pinch it off, thus giving the stem and roots more strength; trim occasionally some of the branches of the vine, pluck off some of the fruit, and provide crutches, or two sticks cross-wise over the vine—so every few feet, the vine can be gently pressed and confined to the earth. This latter plan of trimming, plucking, and confining the vine to the earth, I practiced in my junior days, 14 or 15 years since; and, at the request of a friend, 10 years since, wrote him out a sort of general guide for gardening, and find I then advised this—I now have it.

I have no idea where I got the notion from, but vines of the melon, pumpkin, or squash, will all root, if not even moved—and much more so if confined. The best melons I ever saw, or rather tasted—grew on a sandy soil, but rich—they were not large, but

really delicious. I have had of them, that grew on very poor sandy land, manured in the hill – but from sowing them in a variety of situations and soils, and also from planting them myself in rich— I think a more luscious melon, to continue longest in bearing, is where the soil is light and moderately rich. We have not the sandy soil, but we can select one that will approach the same object, and by preparing a small spot, the cost will be trifling, and the return far greater than as I was advised to do—even last year —and followed the advice to the cost of a total failure. I had prepared by fall ploughing, &c, with oats sowed; in the spring threw up 3 furrows, planted—intending to plough out as time and necessity required, turning in the green oats as a manure—but after some 5 furrows or 6 were thrown up, a friend advised it to remain— rows 10 feet apart—as the oats would be a good shade, like unto potatoe vines – and they were a good shade! too good for a thirsty man, in a hot summer, with rotten limestone water. I learnt a lesson. Will your readers also profit? "If it is worth doing, it is worth doing *well*."

Your friend, I. of H.

[*S. W. Farmer.*

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TO PROTECT GRAIN FROM RATS.

One of our subscribers wishes us to state for the benefit of his brother farmers, that *green Elder* boughs scattered in and about a mow of rye or other grain, will effectually protect it against the depredations of rats. These vermin are often very troublesome and destructive in their ravages in the farmer's barn; and if so simple a remedy will prevent their mischief, it should be known and remembered by all.

[*Farmers' Gazette.*

A farmer informs us that he drove the rats from his premises by laying stalks of green mullein, with the leaves and stalks as they grew, in the places frequented by them.

[*Ed. Far. Journal.*

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SALIVA IN HORSES.

Saliva in horses can be cured by mixing a table spoonful of flour of sulpher in the salt that is given them from time to time.

—

PEACH WORM—TAR.

A neighbor informs me that the application of hot tar to the roots of peach trees effectually excludes the worm. The earth is removed for a few inches down and the tar applied. It is not intended of course to *destroy* the worm, but to prevent its entrance in trees yet unaffected.

[*Cultivator.*

MONTHLY CALENDAR

OF

HORTICULTURE AND FLORICULTURE,

FOR APRIL, 1843.

VEGETABLE GARDEN.

This is the best month for planting all kinds of Snap and Bush Beans. The varieties have of late years increased so much, that it is now difficult to distinguish many of those that were cultivated some twenty years ago. Different individuals give a preference to different kinds. In this city, the Gardeners usually obtain their supplies of Seed Beans from our Seed stores, as their Seeds, preserved in the summer, are usually destroyed by the weevil. Plant your Beans in rows about 20 inches apart—let the plants stand 6 inches from each other in the row, covered with a rake or hoe with 1 inch of earth. The larger kinds of Beans may be planted in rows 2 feet apart.

Your Carrots, Parsnips, Beets and Turnips, sown last month, will now be advancing fast in their growth; they must now be kept clear of weeds, be carefully hoed and thinned to their due distances. The Parsnips and Beets to stand within 8 or 12 inches of each other—the Carrots 5 or 6 inches when young, and then may be gradually thinned for table use, suffering the general crop of plants to stand 10 or 12 inches apart—allow 8 or 9 inches between the Turnips—they should be thinned when the rough leaves are about half an inch broad.

The Onions and Leeks that were planted in the fall will now begin to swell—let them be kept carefully weeded, and where any are running to seed-heads, let them be pulled off—let the Onions stand about 8 inches frow each other.

Sow Radishes every two weeks—you may also sow Leek Seed pretty thick in a bed for future transplanting—sow also Lettuce Seeds of various kinds—sow Celery and small Salading.

Plant Cucumbers and Melons about the beginning of this month—this is the most favorable season.

Plant Okra and Tomatoes Seeds—let the former be planted on ridges 4 or 5 feet apart, on low ground—the Tomatoes may be sown in beds, and when the plants are sufficiently grown, let them be set out in hills 5 feet apart.

Plant also, in the beginning of this month Squashes and Pumpkins.

Hoe your Irish Potatoes, and keep them clear of weeds.

Let all kinds of Seeds be well watered till they come up.

FRUIT GARDEN

There is not much work to be done in this department this month, as it is to be presumed your Fruit Trees were carefully pruned last month. You may, however, remove all yound and useless shoots, especially those of the Grape, where the eye may be easily rubbed off by the finger, leaving only such shoots as are necessary for the next year's growth Examine carefully your Pomegranate and Fig Trees; most of these have been killed by the frost, but they will put out from the roots, and will soon form bearing trees.

Your new beds of Strawberries should be kept clear from weeds, and the runners carefully pulled off.

Let your new planted trees in dry weather be watered at least once a week, and we have found an advantage in watering the branches as well as the roots.

FLOWER DEPARTMENT.

Sow Cleome Poinciana and all seeds natives of warm climates. If sown early, they seldom come up on account of the cold, and if later, the summer proves too short for their bloom.

POUDRETTE.

THE best, the most convenient, and the cheapest MANURE for those who have to purchase and transport any distance. One barrel of Poudrette (4 bushels) contains as much fertilizing property as sixty bushels of stable or yard Manure. For Corn, Potatoes, Melons, Grape Vines, Fruit Trees, and all kinds of garden vegetables, and especially for Flowers, there is nothing equal to it as a fertilizer, and it may be used with as little inconvenience as ashes, or plaster, or sand—it has been extensively used by many farmers during the past four years, and the demand is rapidly increasing. Present price, $5 for three barrels, or $15 for ten barrels, delivered on board of vessels in the harbor of New-York, at one day's notice. Orders by Mail, cash enclosed, may be addressed to, and will be promptly attended to, by

D. K. MINOR, Agent, 118 Nassau-street, N. Y.

The subscriber having accepted the Agency for the sale of Poudrette, will receive and have executed cash orders, as may be forwarded to him, (enclosing the cash) at the New-York prices, with the addition of the expenses incurred. In all cases, payment must be made, on the delivery of the article, without distinction of persons.

March 26. JOHN D. LEGARE, 69 East-Bay.

Ploughs, Cultivators, Corn & Cob Crushers.

THE Subscriber keeps constantly on hand, Ruggles, Nourse & Mason's best PLOUGHS, which have taken numerous premiums at the North, and which he has sold for the three last years, giving general satisfaction to our Planters; they vary in price from $6 to $10, the first being a light one horse Plough, the last a four horse Plough. Also, Freborn Ploughs, from $3 25, upwards, according to the size. The Cultivators are of the best construction, and now generally used in cultivating Corn at the North.

CORN & COB CRUSHERS, made by Hussey, Murray & Sinclair, with every kind of Implement necessary for the Field or Garden culture, consisting in part, of STRAW-CUTTERS, CORN SHELLERS, HOES, SPADES, SHOVELS, AXES, HATCHETS, DUNG FORKS and DRAGS, SCYTHES, CRADLES, &c., &c.

AND

An extensive assortment of *GARDEN and FIELD SEEDS*, which are warranted to be of the best varieties. Most of these are imported direct from Europe, by the Subscriber,

October 29. J. D. LEGARE,
No. 61, *East-Bay, Charleston.*

French Fruit Trees—Camillas, &c.

THE Subscriber has on hand an excellent assortment of FRUIT TREES, imported by him direct from Paris last Spring, and which he had planted out here. They consist of PEAR, APPLE, CHERRY, APRICOT, PLUM, Madeira WALNUT and JUJUBE TREES. Many of the Pears and Apples blossomed last Spring and some bore fruit. It is therefore *presumed* that a large number will do so the coming season. He also expects in the month of December a further supply of Fruit Trees, Roses &c. from Paris.

He offers also, for sale, Peach, Nectarine & Apricot Trees of American growth; and will also receive orders which will be executed at 10 per cent. on cost and charges, for any discription of Fruit Trees, Ornamental Shrubs, or Plants, from the Nurseries of *Sinclair & Corse, of Baltimore, Robert Buist, of Philadelphia*, or any of those in the neighbourhood of Boston.

The prices of the French Fruit Trees vary from $1 to 2, according to the size of the Trees. The American Trees are at from 37 to 75 cents.

Also, consisting from last year's Stock,

A few very fine varieties of CAMILLAS, AZALIAS and other Ornamental Green-house Plants, and a choice collection of ROSES, consisting of Tea, Bengal, Bourbon, Perpetual Damask, &c. He expects also, to receive a further supply of the above at the proper season.

October 29 J. D. LEGARE,
No. 61, East-Bay, Charleston.

THE SOUTHERN AGRICULTURIST.

☞ In consequence of letters and communications being frequently received by the subscriber, addressed to him as "Editor of the Southern Agriculturist," he deems it proper to state, that he is in no way or manner whatever, connected with that Journal, either as Editor, Conductor, Proprietor or Publisher. That it is now under the sole control and direction of its Proprietor, Mr. A. E. MILLER, to whom all communications and letters should be addressed.

J. D. LEGARE.

Feb. 24th, 1843.

LIST OF PAYMENTS.

Subscriptions received on account of the Southern Agriculturist, since Jan. 1843, by J. D. Legare.—Paul Dumas, 1841 & '42; Charles Delaigle, 1842; A. Simmons, 1841 & '42; John Rivers, 1843; Robert Chisolm, 1842; John Whitehead, for 5 years.

Payments received by A. E. Miller.

For 1842.

Lewis R. Sams,
W. H. Mongin,
Richard Cunningham.

For 1843, in advance.

Dr. S. W. Barker,
Stephen G. Devereux,
David Gaillard, jr.
O. H. Middleton,
W. H. Mongin,
Isaac M. Dwight,
Dr. A. M. Walker.
William G. Walker,
Hon. Angus Patterson,
Thomas Wilson,
Col. John N. Williams,
Dr. Wm. Bradleford.

TO OUR CORRESPONDENTS.

We have received a communication from Dr. L. R. Sams, in reply to some observations in the *Temperance Advocate* of October, *on the Cultivation of Indian Corn*, which appeared in our Number for May last, which shall have a place in our next Number; and which we regret came to hand too late for our present Number.

The article on *Experiments in Manures*, from St. John's Berkley, signed "R." shall have a place in our next.

We regret that this Number could not contain the very interesting account of the proceedings of the Agricultural Society of St. John's Colleton, with the correspondence between the Hon. Whitmarsh B. Seabrook, and Mr. E. Ruffin, with his directions for an accurate survey of the State, but hope we shall be enabled to find room for them in our next.

The very liberal support the Journal has received, and the continual communications furnished it, give us much encouragement to continue it.

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RESPECTFULLY inform their friends, and the public generally, that they execute all kinds of Plain, Ornamental, and Fancy Printing in the neatest style, at short notice. They solicit the patronage of their friends.

They have just received a splendid assortment of COMBINATION BORDERS, for Cards, Fancy Store Bills, &c. which will be worked in the most variegated and beautiful style.

January, 1843.